

AMENDMENTS TO THE CLAIMS

Claims 9-13 and 19-46 were pending in the Application. Claim 9 is an independent claim and claims 10-13 and 39-41 depend therefrom. Claim 19 is an independent claim and claims 20-26 and 42-46 depend therefrom. Claim 27 is an independent claim and claims 28-38 depend therefrom. Claims 1-8 and 14-18 were previously canceled.

Listing of Claims:

This listing of claims will replace all prior versions and listings of claims in the application.

1-8. (Canceled)

9. (Previously Presented) A modem device comprising:

a first input that operates to receive information from a first device that is utilizing the modem device to communicate with a second device through a communication network;

a second input that operates to receive information from the second device through the communication network; and

a recording module processor communicatively coupled to the first input and the second input that operates to fully record input information arriving at one or both of the first input and the second input during real-time operation of the modem device for subsequent non-real-time analysis.

10. (Previously Presented) The modem device of claim 9, further comprising a command

input that receives modem control commands from the first device, and wherein the recording module processor further causes modem control commands arriving at the command input during real-time operation of the modem device to be fully recorded for subsequent non-real-time analysis.

11. (Previously Presented) The modem device of claim 9, wherein the first device is a personal computer, and wherein the recording module processor operates to cause the input information arriving at the first input from the personal computer and arriving at the second input from the second device through the communication network, during real-time operation of the modem device, to be fully recorded on a memory device of the personal computer.

12. (Previously Presented) The modem device of claim 9, wherein the recording module processor operates to cause input information arriving at the first input from the first device and arriving at the second input from the second device through the communication network to be communicated to a networked computer communicatively coupled to the modem device over the communication network and fully recorded on a memory device of the networked computer.

13. (Previously Presented) The modem device of claim 9, wherein the modem device comprises an ADSL modem.

14-18. (Canceled)

19. (Previously Presented) A non-real-time playback environment for analyzing real-time performance of a modem, the environment comprising:

a memory comprising input information recorded by a recording module residing on a modem, wherein the recording module fully records the input information received at the modem during real-time operation of the modem; and

a playback module communicatively coupled to the memory, the playback module comprising a model of the modem that the playback module executes according to the input information in the memory.

20. (Previously Presented) The non-real-time playback environment of claim 19, wherein the input information comprises:

information from a computer coupled to the modem; and

information from a device with which the computer was communicating through a communication network using the modem.

21. (Previously presented) The non-real-time playback environment of claim 19, wherein the input information comprises data and modem control commands sent from a computer to the modem.

22. (Original) The non-real-time playback environment of claim 19, further comprising a debugging module communicatively coupled to the playback module that provides for controlling and observing the operation of the playback module.

23. (Previously Presented) The non-real-time playback environment of claim 19, wherein the model of the modem comprises a bit-exact software model of the modem that, when executed, produces results that are the same as an original modem that the bit-exact software model is modeling.

24. (Previously Presented) The non-real-time playback environment of claim 19, further comprising a computer communicatively coupled to the modem, and wherein the memory is a memory device of the computer.

25. (Original) The non-real-time playback environment of claim 24, wherein the computer comprises the playback module.

26. (Original) The non-real-time playback environment of claim 19, further comprising a networked computer communicatively coupled to the modem over a computer network, and wherein the networked computer comprises the memory.

27. (Previously Presented) A method for analyzing real-time operation of a modem, the modem comprising a first input that receives information from a first device that is utilizing the modem to communicate with a second device through a communication network and a second input that receives information from the second device through the communication network, the method comprising:

operating the modem in real-time to communicatively couple the first device and the second device, the modem comprising a recording module;

while operating the modem in real-time, utilizing the recording module to fully record input information input to at least the first and/or second inputs of the modem; and

after operating the modem in real-time, executing a model of the modem, where the model is responsive to the recorded input information.

28. (Previously Presented) The method of claim 27, wherein:

the first device comprises a personal computer; and

utilizing the recording module comprises utilizing the recording module to fully

record the input information input to at least the first and second inputs of the modem to a memory device of the personal computer.

29. (Previously Presented) The method of claim 28, wherein:
operating the modem comprises driving the modem as an operating system device driver on the personal computer.

30. (Previously Presented) The method of claim 27, wherein:
the second device is a computer; and
utilizing the recording module comprises utilizing the recording module to fully record the input information to a memory device of the computer.

31. (Previously Presented) The method of claim 30, wherein utilizing the recording module of the modem comprises executing a recording application program on the computer.

32. (Previously Presented) The method of claim 27, wherein:
the first device is a personal computer; and
utilizing the recording module to fully record the input information input to at least the first and/or second inputs of the modem comprises utilizing the recording module to fully record the input information comprising:
data input to the first input from the personal computer;
commands input to a command input of the modem from the personal computer; and
samples input to the second input from the second device through the communication network.

33. (Previously Presented) The method of claim 27, wherein executing the model of the modem comprises executing a software model of the modem, and the method further comprises reading the recorded input information into the software model.

34. (Previously Presented) The method of claim 27, wherein executing the model of the modem comprises executing a bit-exact software model of the modem.

35. (Previously Presented) The method of claim 27, wherein:
the model of the modem comprises a software component that is the same as a software component of the modem; and
executing the model of the modem comprises executing the software component.

36. (Previously Presented) The method of claim 27, wherein:
the model of the modem comprises a hardware component that is the same as a hardware component of the modem; and
executing the model of the modem comprises utilizing the hardware component.

37. (Previously presented) The method of claim 27, further comprising debugging operation of the modem by, at least in part, observing execution of the model with the recorded input information in non-real-time.

38. (Previously presented) The method of claim 27, wherein the modem comprises an ADSL modem.

39. (Previously Presented) The modem device of claim 11, wherein the modem device operates to cause the input information to be fully recorded on the memory device of the personal computer by, at least in part, being driven as an operating system (OS) device driver of the personal computer to write the input information directly to a hard drive of the personal computer.

40. (Previously Presented) The modem device of claim 9, wherein the recording module processor is integrated into an integrated circuit of the modem device.

41. (Previously Presented) The modem device of claim 9, wherein the recording module processor operates to cause the input information arriving at the first input and the second input during real-time operation of the modem device to be fully recorded in exactly the same sequence as the input information is received at the modem device.

42. (Previously Presented) The non-real-time playback environment of claim 19, wherein the model of the modem comprises a bit-exact software model of the modem that exactly mimics the real-time operation of the modem.

43. (Previously Presented) The non-real-time playback environment of claim 19, wherein the playback module comprises playback software that, when executed by a processor, causes the reading of the input information into the model of the modem.

44. (Previously Presented) The non-real-time playback environment of claim 19, wherein the model of the modem comprises a software component that is the same as a software component of the modem being modeled.

45. (Previously Presented) The non-real-time playback environment of claim 19, wherein the model of the modem is a hardware model that comprises an actual hardware component that is the same as a hardware component of the modem being modeled.

46. (Previously Presented) The non-real-time playback environment of claim 19, wherein the playback module comprises playback software comprising a bit-exact model of the operation of the modem, such that any modem behaviors that occurred in real-time operation during the period of time over which the input information was obtained will recur during execution of the playback software in the non-real-time playback environment.